

# CVS1-RA SERIES

MVS Series

CVS Series

CVS Series APPLICATION

CVSE1-RA

CVS1-RA

CVS2-RA

CVS3-RA

CVS4-R

OPTIONS



## Easy setup Color sensor

- All in one color vision sensor
- High speed : 0.6 - 22ms
- Stable color detection by calculating hue of each pixel



### Wide range line-up

- CVS1-N20-RA Standard type
- CVS1-N10-RA Long range type
- CVS1-N40-RA Macro view type
- CVS1-N21-RA Narrow view type

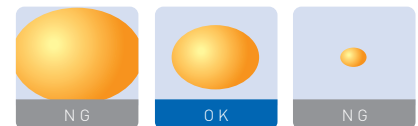
### One threshold mode

Determine OK when the area that the color matches exceeds the threshold.



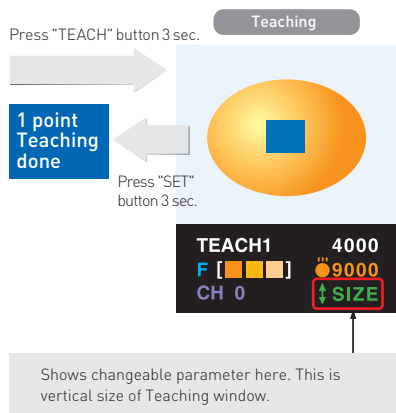
### Two threshold mode

Determine OK when the area that the color matches is in two thresholds.



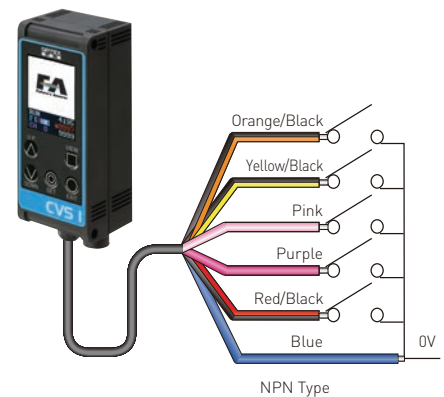
### Easy Teaching

Teaching is easily done by moving the teaching cursor on the part that you want to teach the color and just set it.



### Up to 16 Bank

16 Banks are available in small all in one package.



### High Speed

Newly developed vision processor enables high speed inspection.

### Zoom function

You can zoom in a part of the object. You can inspect 16 parts of the object changing Bank efficiently.

### Stable inspection

It calculates color hue of each pixel that prevent miss-inspection.

### Wide coverage line-up

You can choose from 4 inspection range/field of view according to inspection target condition.

## High performance

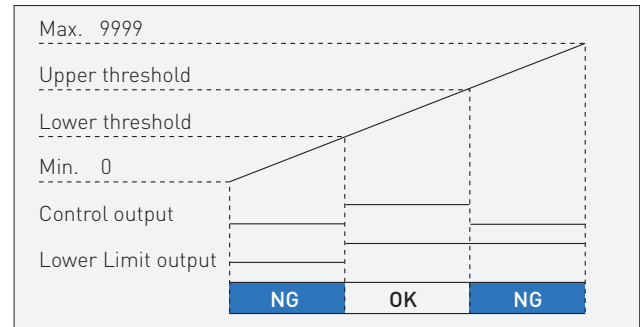
### Setup Adjustable while line is running

CVS1-RA provides output with the setup parameters given even while you are adjusting setup. You don't have to stop the line.



### Lower Limit output

You can see which the NG output is lower than lower threshold or higher than upper threshold.



### Stable inspection

It calculates color hue of each pixel that prevent miss-inspection affected by external light and brightness changes of lighting. Stable inspection is available and you can setup CVS1-RA just like you do for photoelectric sensor.

**When upper part is brighter than lower part**

| CVS1-RA                        | Conventional vision sensor                        |
|--------------------------------|---|
| <p>Correct color to evenly</p> | <p>Inspection is done with hue and brightness</p> |

**When a part is brighter than other part**

| CVS1-RA                        | Conventional vision sensor |
|--------------------------------|----------------------------|
| <p>Correct color to evenly</p> | <p>It can't correct</p>    |

**When distance varies**

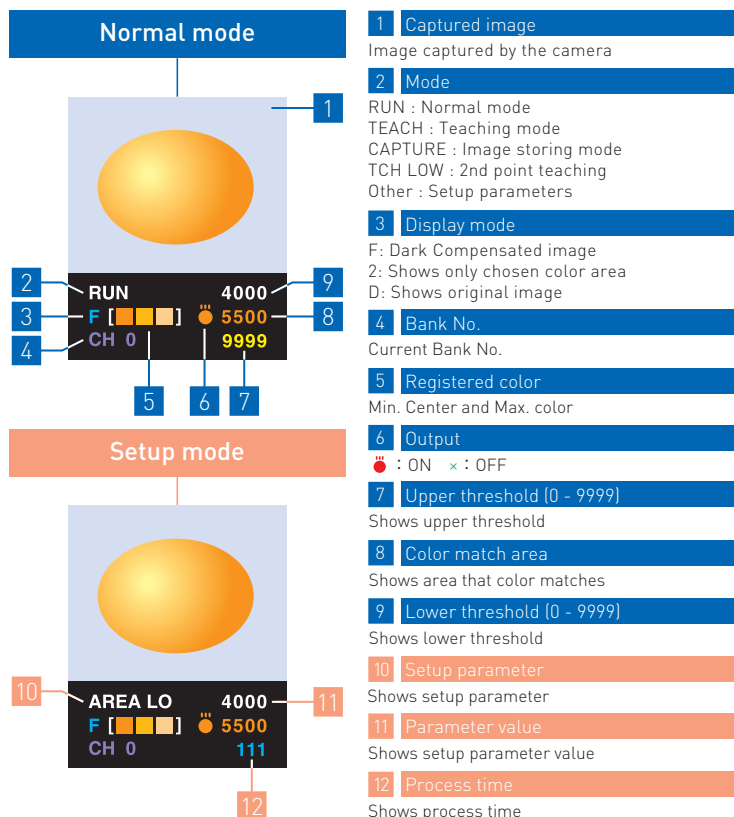
| CVS1-RA                        | Conventional vision sensor                 |
|--------------------------------|--|
| <p>Correct color to evenly</p> | <p>The part must be set for correction</p> |

**When the object is glossy**

| CVS1-RA   | Conventional vision sensor |
|---|----------------------------|
| <p>Correction is done except saturated part</p> | <p>It can't correct</p>    |

## Display

There are two modes : Normal / Setup



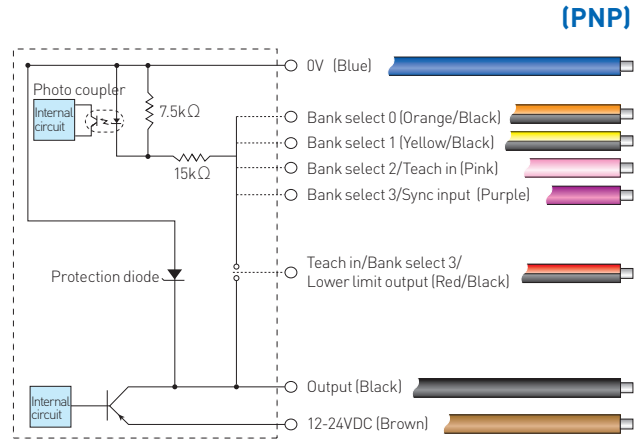
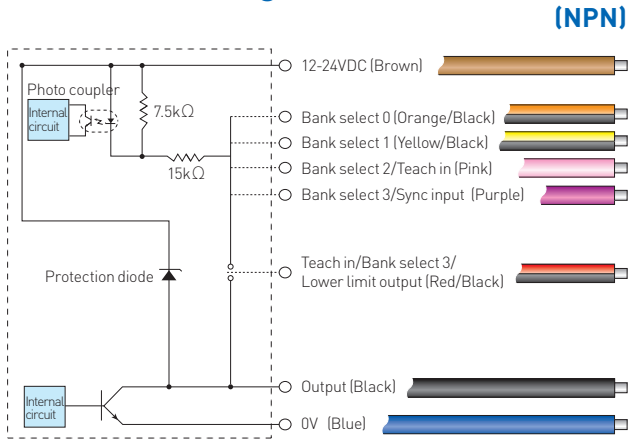
## Switches



## Specifications

| Model                        | CVS1-N10-RA<br>CVS1-P10-RA   | CVS1-N20-RA<br>CVS1-P20-RA | CVS1-N21-RA<br>CVS1-P21-RA | CVS1-N40-RA<br>CVS1-P40-RA |
|------------------------------|--|----------------------------|----------------------------|----------------------------|
| Detection angle              | 10°  | 20°                        |                            | 40°                        |
| Working distance             | 210 to 270mm   | 90 to 150mm                | 31 to 39mm                 | 50 to 100mm                |
| Field of view                | 40 x 50mm to 55 x 65mm   | 40 x 50mm to 65 x 75mm     | 17 x 20mm (±10%)           | 50 x 65mm to 100 x 115mm   |
| Light source                 | White LED 12 pcs built-in  |                            |                            |                            |
| Image sensor                 | 330,000 Pixel CMOS color image sensor  |                            |                            |                            |
| Supply Voltage               | 12 to 24V DC±10%   |                            |                            |                            |
| Power consumption            | Max. 120mA / 24V DC  |                            |                            |                            |
| Resolution                   | 8 x16 to 208 x 236   |                            |                            |                            |
| LED light duration           | Approx.50,000 hours (In normal temperature and humidity. Brightness level down by 1/2 of the initial level)                                    |                            |                            |                            |
| Response time                | 15ms to 36.3ms (Factory setting : 18.8ms)  |                            |                            |                            |
| Output                       | NPN or PNP open collector output x 2 (one of them is "Lower limit output" selectable by bank input #1) max.100mA Residual voltage 1.0V or less |                            |                            |                            |
| Input                        | Totally 4: Bank select 0-2, Bank select 3 (switchable to Sync input), Teach in (switchable to Bank select 3 or Lower limit output)             |                            |                            |                            |
| Operating temperature        | 0 to 40°C (No condensation)  |                            |                            |                            |
| Operating humidity           | 35 to 85%RH  |                            |                            |                            |
| Storage temperature/humidity | -20 to 70°C,35 to 95%RH (No condensation)  |                            |                            |                            |
| Vibration/shock resistance   | 10 to 55Hz Amplitude 1.5mm / 50G (500m/s <sup>2</sup> )  |                            |                            |                            |
| Material                     | Case:ABS / Display and Lens : Acryl or Polycarbonate   |                            |                            |                            |
| Protection structure         | IP67   |                            |                            |                            |
| Weight                       | Approx.200g (including cable)  |                            |                            |                            |

## Connection diagram

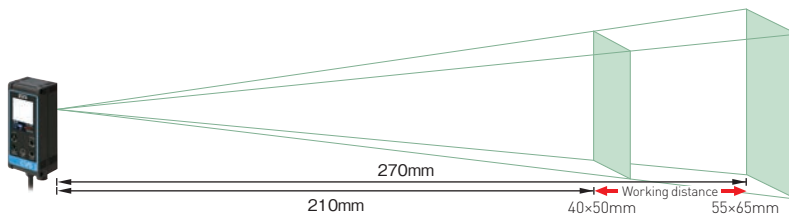


## Bank table

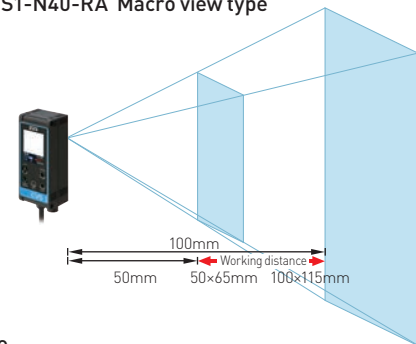
| Bank No. | Bank select input |         |                 |                 |
|----------|-------------------|---------|-----------------|-----------------|
|          | 3(Purple)         | 2(Pink) | 1(Yellow/Black) | 0(Orange/Black) |
| 0        | OFF               | OFF     | OFF             | OFF             |
| 1        | OFF               | OFF     | OFF             | ON              |
| 2        | OFF               | OFF     | ON              | OFF             |
| 3        | OFF               | OFF     | ON              | ON              |
| 4        | OFF               | ON      | OFF             | OFF             |
| 5        | OFF               | ON      | OFF             | ON              |
| 6        | OFF               | ON      | ON              | OFF             |
| 7        | OFF               | ON      | ON              | ON              |
| 8        | ON                | OFF     | OFF             | OFF             |
| 9        | ON                | OFF     | OFF             | ON              |
| 10       | ON                | OFF     | ON              | OFF             |
| 11       | ON                | OFF     | ON              | ON              |
| 12       | ON                | ON      | OFF             | OFF             |
| 13       | ON                | ON      | OFF             | ON              |
| 14       | ON                | ON      | ON              | OFF             |
| 15       | ON                | ON      | ON              | ON              |

## Field of View

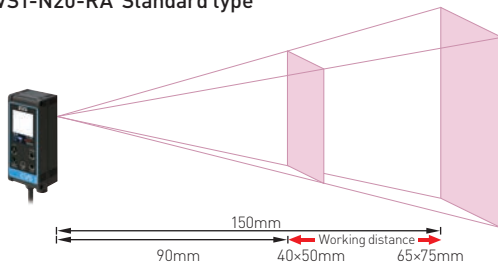
CVS1-N10-RA Long range type



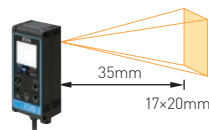
CVS1-N40-RA Macro view type



CVS1-N20-RA Standard type



CVS1-N21-RA Narrow view type



# CVS SERIES APPLICATION

MVS Series

CVS Series

CVS Series APPLICATION

CVSE1-RA

CVS1-RA

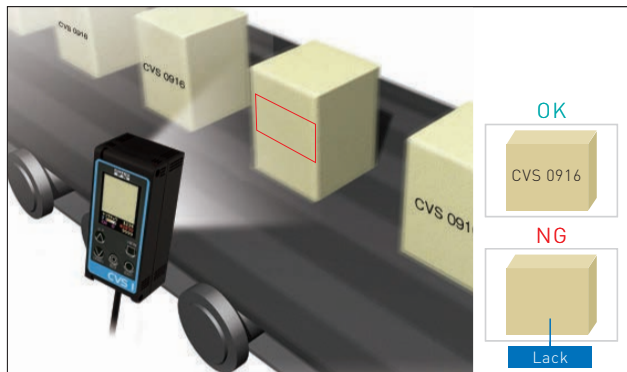
CVS2-RA

CVS3-RA

CVS4-R

OPTIONS

## 1. Checking existence of printing on the box



### CVS1-RA

Set the extracted color from the printing and check its area in the field of view

## 2. Checking the lid of instant foods



### CVS2-RA

Check the color and shape by its pattern matching function

## 3. Checking existence of cutting tape on the film



### CVSE1-RA

Set the extracted color from the cutting tape and check its area in the field of view

## 4. Checking multiple colors on the box



### CVS2-RA

Check existence of multiple color on the box registering multiple colors as reference

## 5. Checking existence of seasoning bag



### CVSE1-RA

Set the extracted color from the seasoning bag and check its area in the field of view

## 6. Checking shelf life on the packaging film



### CVS4-R

Check the date of shelf life on packaging film. It has calendar function so checking overnight is available

### 7. Checking existence of label on package



#### CVSE1-RA

Set the major color on the label and check its area in the field of view

### 8. Checking existence of needle cap



#### CVS1-RA

Existence of needle cap can be detected easily by color area inspection even in a big FOV

### 9. Checking shelf life on the milk package



#### CVS4-R

Check the date of shelf life on milk package. It has calendar function so checking overnight is available

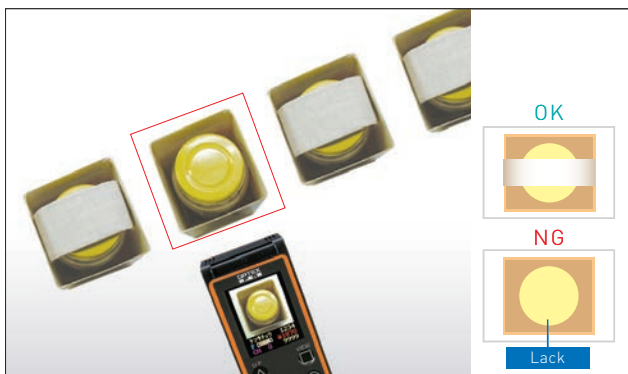
### 10. Checking expiration date on the package



#### CVS4-R

Check the expiration date on the package. It can just check number of character as well

### 11. Checking existence of description of pills



#### CVSE1-RA

Set the color area of description of pills in the field of view

### 12. Checking overlapping of the label



#### CVS3-RA

Check the overlapping label by its edge detection function

### 13. Checking marking on electric components



#### CVSE1-RA

Set the color of the marking and check its area in the field of view. Narrow angle view version can zoom up small area.

### 14. Checking ON/OFF of LED on PWB



#### CVS2-RA

Check the color and position of LED by its color pattern matching function

### 15. Checking order of the color of wires



#### CVS2-RA

Check the color and position of wires by its color pattern matching function

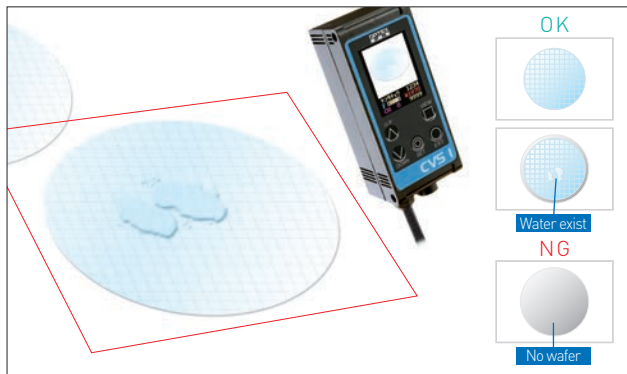
### 16. Checking existence of bad marking on parts



#### CVS2-RA

Check color of the parts and color of bad marking on the parts to detect existence of bad parts

### 17. Checking existence of wafer



#### CVS1-RA

Set the color of the wafer as its reference and detect existence of the wafer even there are some water on it

### 18. Checking direction of the parts



#### CVS3-RA

Check the edge of the marking on the IC package and detect direction of it

### 19. Checking position of welded part



#### CVS2-RA

Set the color of the pipe and welded part and detect welded part stably by its pattern matching function

### 20. Checking shape of assembled parts



#### CVS3-RA

Check the shape of the assembled parts by edge detecting function utilizing back lighting

### 21. Checking direction of the parts on conveyor



#### CVS2-RA

Check the color and position of the surface pattern by its color pattern matching function

### 22. Checking size of the nut



#### CVS3-RA

Check size of the nut by edge detecting function

### 23. Checking characters on metal parts



#### CVS4-R

Check the characters engraved on the metal parts by its OCR function

### 24. Checking existence of lot number on the spark plugs



#### CVS1-RA

Check the color area of the printed characters on the spark plugs

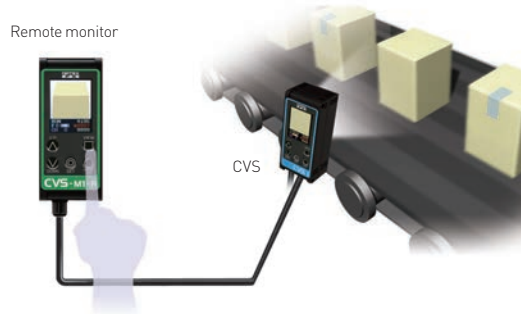


## Accessories for CVS series

### Remote monitor (with 3m cable)

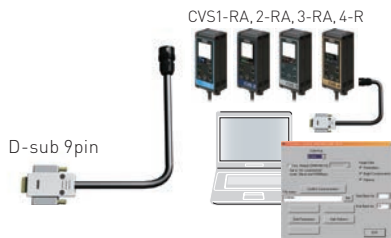


**CVS-M1-R**  
For CVS series



You can control from Remote monitor that has LCD and buttons to control remotely. The buttons work same as CVS series itself.

### PC I/F cable (2m)



**CVS-C2C**  
For CVS1-RA, 2-RA, 3-RA, 4-R  
You can download the I/F software from our homepage. You can setup CVS1-RA, CVS2-RA, CVS3-RA and CVS4-R through each software and can get registered image. You can also modify mask area easily on the PC display.

**Required PC spec.**  
- Microsoft Windows 7  
- RS232 I/F  
Software is downloadable from <http://www.optex-fa.com>

### Video cable (3m)



**CVS-CN**  
For CVS series  
You can see the display image connecting standard TV monitor (NTSC).

### PC I/F cable + I/F cable for Video Out (2m)



**CVS-C2Y**  
For CVS1-RA,2-RA,3-RA,4-R  
You can connect PC and CVS-M1-R. You can see the screen image on the CVS-M1-R.  
\* You can't control through CVS-M1-R.

### Extension cable for Remote monitor (3m)



**CVS-C3S**  
For CVS-M1-R  
You can connect Remote monitor through this cable up to 15m (4 CVS-C3S = 12m + 3m cable of Remote monitor)

### PC I/F cable + Video cable (2m)



**CVS-C2P(2m)**  
For CVS1-RA,2-RA,3-RA,4-R  
You can connect PC and get video signal at a time.

## External LED lighting

When you need brighter lighting and/or lighting from other direction to get better image, you can utilize external LED lighting. Please refer Page 54 for other lighting and power supply.

### High brightness Bar LED lighting with bracket



OPDB-50x15WS

**OPB-5015W2-B**  
50x15mm  
**OPB-10015W2-B**  
100x15mm

### Power supply LED controller



OPPD-15

### Bracket for Lighting



**CVS-OPDB-2000**  
**CVS-OPDB-3040**  
**CVS-OPDB-6080**

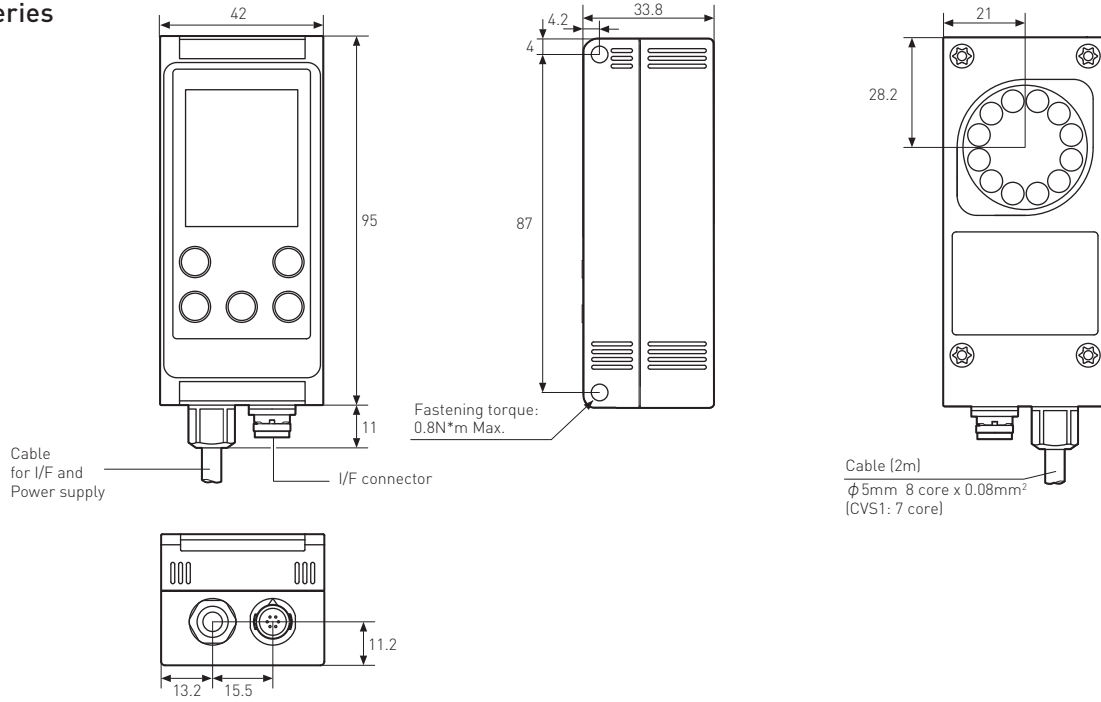
2 OPDB-50x15WS and CVS-OPDB-2000



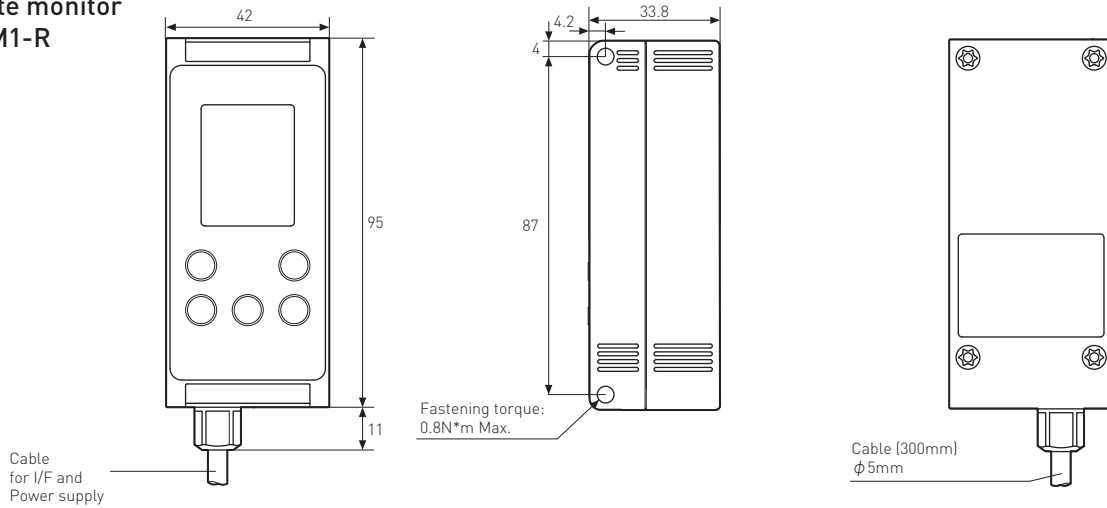
**CVS-OP1000L**  
This is for mounting CVS series and external LED lighting.

## Dimensions

### CVS Series



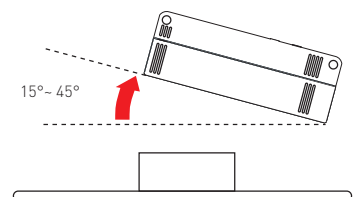
### Remote monitor CVS-M1-R



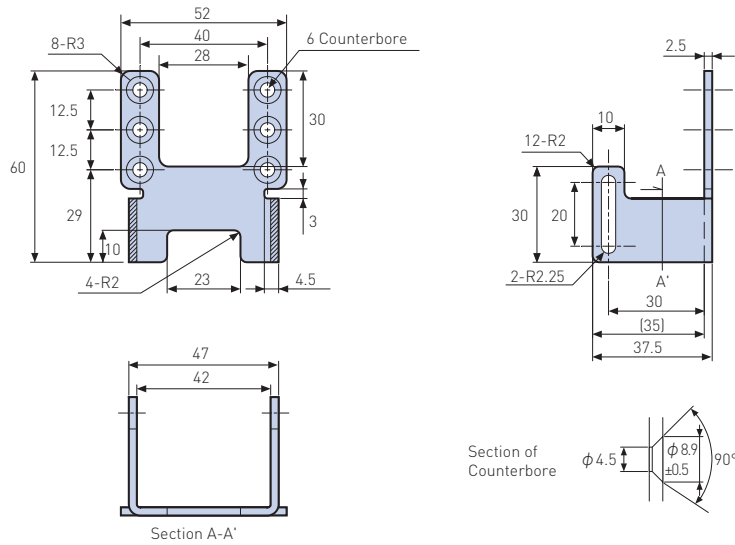
(unit: mm)

### Tips for mounting CVS series

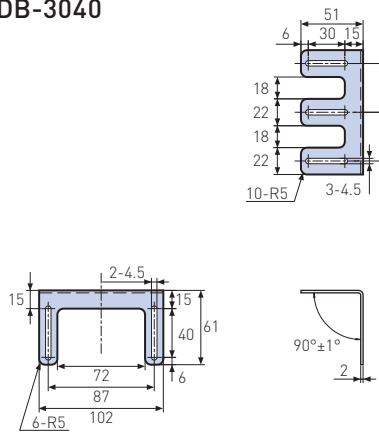
- Please determine Working distance and Field of View so that you choose correct model number of CVS series.
- Please use M4 \* 50mm screws to mount CVS series
- Please take care about distance between CVS and target object to get stable size of Field of View.
- Please mount CVS at 15 to 45 degree to prevent specular reflection from the object especially from glossy object.
- When the object moves fast, you have to set shutter speed shorter. Then, you will need brighter lighting to get better image. Please try external lighting in this case.



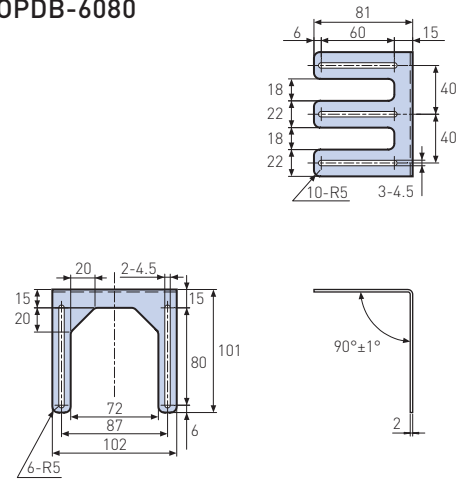
**Bracket for Lighting  
CVS-OPDB-2000**



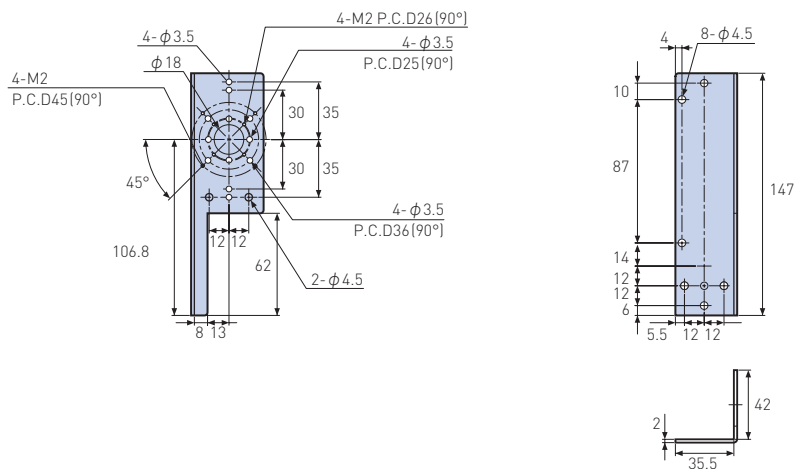
**CVS-OPDB-3040**



**CVS-OPDB-6080**



**CVS-OP-1000L**



(unit: mm)